UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,949	11/06/2006	Masato Mori	P30449	8311

52123 7590 05/01/2009

GREENBLUM & BERNSTEIN, P.L.C.
1950 ROLAND CLARKE PLACE
RESTON, VA 20191

EXAMINER	
PATEL, DEVANG R	
ART UNIT	PAPER NUMBER
1793	

NOTIFICATION DATE	DELIVERY MODE
05/01/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com
pto@gbpatent.com

Office Action Summary	Application No.	Applicant(s)	
	10/597,949	MORI ET AL.	
	Examiner	Art Unit	
	DEVANG PATEL	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/30/09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claim 1** is rejected under 35 U.S.C. 102(b) as being anticipated by Zhou et al. (US 5985043).

a. **Regarding claim 1,** Zhou et al. ("**Zhou**") discloses an electronic component mounting method in which joints between a circuit substrate 100 and electronic component 130 (figs. 1-3) are reinforced using a resin 120/320 (adhesive composition includes resin - abstract), the method comprising:

i. supplying an unhardened reinforcing resin 120/320 on the circuit substrate 100;

ii. supplying a solder paste 140 (col. 10, lines 40-45) on the reinforcing resin such that the resin is disposed between the solder paste and bond areas 110/210 of the circuit substrate 100 (figs. 1, 3);

iii. placing the electronic components on the circuit substrate (figs 1-5); and

iv. heating (i.e. reflow) the resin and the solder paste (col. 11, lines 55-67). It would necessary flow that in response to heating step of Zhou, the

solder paste intrinsically flows through the resin and contacts the bonds areas of the substrate in order to interconnect the substrate and the electronic components.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. **Claims 2-5** are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. (US 5985043) as applied to claim 1 above, and in view of Nakamura et al. (US 6365499).

b. **As to claim 2,** Zhou discloses cooling the resin and the paste, thereby solder-bonding the components on the substrate and hardening the resin (col. 11, lines 61-67). It is unclear whether Zhou teaches that resin 120 (fig. 1) is in sheet-form. However, such is well-known in the art as shown by Nakamura et al. ("**Nakamura**"). Similar to layer 120 of Zhou, Nakamura discloses supplying a sheet-form resin 43 on the circuit substrate 40 (fig. 5B; col. 10, lines 16-20)]. The claim would have been obvious because supplying a sheet-form resin is an equivalent structure known in the art and one of ordinary skill would have found it obvious to deposit resin layer of Zhou in a manner similar to sheet-form resin of Nakamura.

c. **As to claim 3,** Nakamura discloses the sheet-form resin including equally spaced apertures 44 [fig. 5c].

d. **As to claims 4-5,** Nakamura discloses the sheet-form resin including recesses/holes (44) [fig. 5c] at positions that match the electrode bond areas (42) on the circuit substrate (40).

4. **Claims 6-14** are rejected under 35 U.S.C. 103(a) as being obvious over Zhou et al. (US 5985043) with supporting evidence of Hayama et al. (US 6051448).

e. **As to claim 6,** Zhou discloses an electronic component mounting method (figs. 1-3) as explained in claim 1 above. Although Zhou does not expressly disclose "printing" solder paste, the step of depositing flux composition (includes solder paste- col. 2 lines 53-65) on one or both surfaces to be joined is analogous to printing the solder paste on bonds areas of the substrate. Nonetheless, **Hayama** et al. (drawn to method of manufacturing an electronic component) discloses that it is known to print patterns of paste on a substrate in forming conventional components (col. 1, lines 20-25). Thus, it would have been obvious to print the solder paste in the method of Zhou since printing a solder paste on the lands of substrate is a known technique of depositing paste and would have yielded the predictable result of bonding components to one of ordinary skill in the art at the time of the invention.

f. Zhou further discloses that the flux composition (includes paste and thermosetting resin- col. 10, lines 40-45; claim 5) may also include viscosity modifiers for adjusting the viscosity (i.e. fluidity) (col. 3, lines 62-64). Zhou further states that in order for the adhesive composition to achieve the largest spreading and wetting by the solder, it should maintain low viscosity up to the melting

temperature of the solder. If the composition becomes too thick before the solder has melted, it will impede the flow of the solder melt and reduce the degree of soldering (col. 9, lines 4-10). One skilled in the art reading Zhou would understand and appreciate the significance of controlling viscosity (i.e. fluidity) of the adhesive paste composition to obtain good wettability and strong solder joints. In view of that, it would have been obvious to a person of ordinary skill in the art at the time of the invention to restrict the fluidity of the solder paste as claimed so that the paste retains its shape in order to provide an increased degree of soldering (Zhou- col. 9, lines 4-10).

g. Zhou discloses the subsequent steps of applying thermosetting resin (part of solder paste on component) on the substrate including solder paste (i.e. both joining surfaces have solder paste), placing the component, soldering, and hardening the resin (col. 11, lines 55-62).

h. **As to claims 7-10,** it would have been obvious to one skilled in the art at the time of the invention to control the fluidity as claimed for the same reasons set forth in claim 6 above. Zhou shows deformation of the paste when the components are mounted [figs. 2, 4-5] and also discloses drying by a heater (reflow furnace).

i. **As to claim 11,** Zhou discloses the reinforcing resin being applied on a specified area.

j. **As to claims 12-13,** Zhou discloses the resin composition having a flux effect [col. 11, line 50] and an effect of bonding [col. 11, line 66].

k. **As to claim 14,** Zhou discloses that the mounted electronic components are retained by deformation of the solder paste that deforms by a mounting load and by adhesive power of the reinforcing resin [figs. 2, 4-5].

Response to Amendment and Arguments

5. Applicant's arguments filed 2/23/09 have been fully considered but they are not persuasive.

6. Applicant argues that flux composition 120 is not disposed between the solder paste 140 and the substrate 100. Examiner respectfully disagrees. The flux 120 (resin) of Zhou is disposed as claimed (figs. 1-3). With respect to solder paste flowing through the resin, such is inherently achieved during the heating step of Zhou.

7. Applicant also argues that Nakamura's resin 43 is a paste, not a sheet. In response, Examiner contends that resin paste layer 43 of Nakamura (as shown in fig. 5b) meets the limitation of "sheet-form resin". It is also noted that Nakamura expressly discloses similar resin sheet layer 50 (fig. 6b; col. 10, line 57).

8. With respect to claim 6, Applicant argues that Zhou's flux composition 120 restricts fluidity of the solder paste 140, whereas, in contrast, the fluidity of solder paste is restricted and then the resin is applied. Since Zhou recognizes the importance of controlling viscosity (i.e. fluidity), one of ordinary skill in the art would have found it obvious to restrict the fluidity of the solder paste as claimed in order to obtain good wettability and desired degree of soldering (Zhou- col. 9, line 4-10). Applicant also argues that in contrast to Zhou, the present invention places the components after

printing solder paste and restricting fluidity. Examiner respectfully disagrees. Zhou teaches applying solder paste on one or both surfaces (col. 2, lines 53-65) and thus, components are placed after printing the paste on the substrate in the combined method of Zhou and Hayama.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 1/30/09 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Conclusion

Applicant's amendment necessitated the modified ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Claims 1-14 are rejected.

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the art would have reasonably understood from the texts. Only specific portions of the texts have been pointed out to emphasize certain aspects of the prior art, however, each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

Applicant is reminded to specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. 1.121; 37 C.F.R. Part 41.37; and MPEP 714.02.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVANG PATEL whose telephone number is (571)270-3636. The examiner can normally be reached on Monday thru Thursday, 8:00 am to 5:30 pm, EST..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. P./
Examiner, Art Unit 1793

/Jessica L. Ward/
Supervisory Patent Examiner, Art Unit 1793